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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,897	09/29/2006	Atsushi Hatabu	040447-0286	8320

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FOLEY AND LARDNER LLP
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007

EXAMINER

HU, FRED H.

ART UNIT	PAPER NUMBER
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2624

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/594,897	Applicant(s) HATABU, ATSUSHI	
	Examiner FRED HU	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/26/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows (see also MPEP 2106):

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

2. Claims 1-6 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. The Federal Circuit^{1[1]}, relying upon Supreme Court precedent^{2[2]}, has indicated that a statutory "process" under 35 U.S.C. 101 must (1) be tied to a particular machine or apparatus, or (2) transform a particular article to a different state or thing. This is referred to as the "machine or transformation test",

^{1[1]} *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

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whereby the recitation of a particular machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility (See *Benson*, 409 U.S. at 71-72), and the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity (See *Flook*, 437 U.S. at 590"). While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform an article nor are positively tied to a particular machine that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. That is, the method includes steps of calculating, estimating, determining, etc. is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally, or without a machine. The cited claims do not positively recite any structure within the body of the claim which ties the claim to a statutory category. Furthermore, the examiner suggests that the structure needs to tie in the basic inventive concept of the application to a statutory category. Structure that ties insignificant pre or post solution activity to a statutory category is not sufficient in overcoming the 101 issue. Additionally, the limitations do not claim data that represents a physical object or substance, the data representing the physical object is not present and therefore can not be modified by the process in a meaningful or significant manner, and no meaningful and significant external, non-data depiction of a physical object or substance is produced. Thus, the limitations do not satisfy the transformation test.

1[1] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

2 *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

2[2] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v.*

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 7-9, and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimizu et. al. (WO2004/063991, US Pat. No. 7,599,512 is used as a translation), hereinafter Shimizu.

Regarding claim 1, Shimizu teaches a template matching method of detecting of detecting the position of an image region similar to a template image region from on a reference image (col. 1 line 9, “region-based matching”), comprising: calculating the similarity of the image region to the template image region at rough position intervals (col. 8 lines 24-67, “...uses two-dimensional similarity at discrete positions computed from a two-dimensional image...”, It is best understood by the examiner that the similarity between an image and a template image is computed at each pixel, which in this case is a rough position interval.); estimating the similarity at a position, where the similarity is not calculated (col. 8 line 60 – col. 9 line 6, “Subpixel estimation is that the similarity is interpolated to estimate a subpixel displacement position.”), making use of the directional gradients of similarity obtained independently in a plurality of directions from the calculated values of similarity (col. 1 lines 49-63, “gradient-based method”, col.

Benson, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

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8 lines 24-31, "...the two-dimensional similarity that has been determined in the sampling period of an image is used to estimate two-dimensional subpixel displacement..."); and determining the position having a small calculated or estimated value of the similarity as the position of the similar image region (col. 8 line 24 - col. 9 line 6, "determine the maximum or the minimum position as displacement between two images.").

Regarding claim 7, Shimizu teaches a template matching apparatus for detecting of detecting the position of an image region similar to a template image region from on a reference image (col. 1 line 9, "region-based matching"), comprising: means for calculating the similarity of the image region to the template image region at rough position intervals (col. 8 lines 24-67, "...uses two-dimensional similarity at discrete positions computed from a two-dimensional image...", It is best understood by the examiner that the similarity between an image and a template image is computed at each pixel, which in this case is a rough position interval.); means for estimating the similarity at a position, where the similarity is not calculated (col. 8 line 60 – col. 9 line 6, "Subpixel estimation is that the similarity is interpolated to estimate a subpixel displacement position."), making use of the directional gradients of similarity obtained independently in a plurality of directions from the calculated values of similarity (col. 1 lines 49-63, "gradient-based method", col. 8 lines 24-31, "...the two-dimensional similarity that has been determined in the sampling period of an image is used to estimate two-dimensional subpixel displacement..."); and means for determining the position having a small calculated or estimated value of the similarity as the position of

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the similar image region (col. 8 line 24 - col. 9 line 6, "determine the maximum or the minimum position as displacement between two images.").

Regarding claim 13, Shimizu teaches a computer readable medium that records a program for causing a computer to execute a template matching method of detecting of detecting the position of an image region similar to a template image region from on a reference image (col. 1 line 9, "region-based matching"), wherein: the method calculates the similarity of the image region to the template image region at rough position intervals (col. 8 lines 24-67, "...uses two-dimensional similarity at discrete positions computed from a two-dimensional image...", It is best understood by the examiner that the similarity between an image and a template image is computed at each pixel, which in this case is a rough position interval.); the method estimates the similarity at a position, where the similarity is not calculated (col. 8 line 60 – col. 9 line 6, "Subpixel estimation is that the similarity is interpolated to estimate a subpixel displacement position."), making use of the directional gradients of similarity obtained independently in a plurality of directions from the calculated values of similarity (col. 1 lines 49-63, "gradient-based method", col. 8 lines 24-31, "...the two-dimensional similarity that has been determined in the sampling period of an image is used to estimate two-dimensional subpixel displacement..."); and the method determines the position having a small calculated or estimated value of the similarity as the position of the similar image region (col. 8 line 24 - col. 9 line 6, "determine the maximum or the minimum position as displacement between two images.").

Regarding claims 2, 8, and 14, Shimizu teaches the limitations of claims 1, 7, and 13, respectively, as discussed above. Further, Shimizu teaches wherein estimating the similarity makes use of the similarity estimated up to that time in addition to the calculated values of similarity (col. 8 lines 24-67, "The similarity is usually matched with the sampling period of an image...Matching in pixels corresponds to a search of the maximum value or the minimum value in similarity...similarity is interpolated...").

Regarding claims 3, 9, and 15, Shimizu discloses the limitations of claims 1 and 2, 7 and 8, and 13 and 14, respectively, as discussed above. Further, Shimizu teaches a template matching method of narrowing down the position of a similar image region stepwise based on a multistep search method (col. 8 lines 24-67, It is best understood by the examiner that the multistep search method consists of first template matching the pixels and then the subpixels.), comprising detecting the position of the similar image region by the template matching method at a search step before the final step thereof.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 4, 6, 10, 12, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et. al. (WO2004/063991, US Pat. No. 7,599,512 is used as a translation), hereinafter Shimizu.

Regarding claims 4, 10, and 16, Shimizu teaches the limitations of claims 1 and 2, 6 and 7, and 13 and 14, respectively, as discussed above. However, Shimizu fails to explicitly teach restricting the value range of the estimated similarity value such that the difference between the estimated similarity value and the similarity of a periphery used for the estimation or the gradient of the similarity does not exceed a threshold value. Shimizu, does teach calculating a minimum and maximum similarity value (col. 2 line 32, "maximum similarity"). Thus, the maximum similarity value would act as a threshold because estimated similarity value and the similarity of a periphery used for the estimation would never exceed the maximum value. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in Shimizu, restricting the value range of the estimated similarity value such that the difference between the estimated similarity value and the similarity of a periphery used for the estimation or the gradient of the similarity does not exceed a threshold value, because this allows for easy calculation of the

Regarding claims 6, 12 and 18, Shimizu teaches the limitations of claims 1, 7, and 13, respectively, as discussed above. However, Shimizu fails to explicitly teach

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when five reference image regions A, B, C, D, E are sequentially located on a straight line, the degree of similarity at the position C from an interpolation value extrapolated assuming gradient continuity from the similarity in the image regions A, B and from an interpolation value extrapolated assuming gradient continuity from the similarity in the image regions D, E in the estimation of the degree of similarity. However, Shimizu does imply this with figure 12. If one was to take five points in a straight line and connect them to each other, the value in the middle, or point C could be easily extrapolated. Examiner is taking official notice that it is well known in the art to use linear interpolation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in Shimizu, when five reference image regions A, B, C, D, E are sequentially located on a straight line, the degree of similarity at the position C from an interpolation value extrapolated assuming gradient continuity from the similarity in the image regions A, B and from an interpolation value extrapolated assuming gradient continuity from the similarity in the image regions D, E in the estimation of the degree of similarity, because using linear interpolation is well known in the art and substituting it in Shimizu would yield predictable results.

8. Claims 5, 11, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et. al. (WO2004/063991, US Pat. No. 7,599,512 is used as a translation), hereinafter Shimizu, in view of Handjojo et al. (US PG Pub No. 2006/0146187 A1), hereinafter Handjojo.

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Regarding claims 5, 11, and 17, Shimizu teaches the limitations of claims 4, 10, and 16, respectively, as discussed above. Further, Shimizu teaches determining the threshold value based on the magnitude of the similarity calculated from the template image region and an image region (col. 8 lines 24-31, "...image subpixel matching...gives the maximum value or the minimum value of the two-dimensional similarity"). However, Shimizu fails to teach obtaining the value by moving the template image region in the same direction as or in the opposite direction to an estimation direction vector obtained by subtracting the position of the nearby image region from the position where the similarity is estimated. Handjojo, in the same field of endeavor of template matching teaches moving the template image region in the same direction to an estimated direction vector obtained by subtracting the position of the nearby image region from the position where the similarity is estimated (figure 13, It is best understood by the examiner that a motion vector is obtained by subtracting two positions.). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in Shimizu, moving the template image region in the same direction to an estimated direction vector obtained by subtracting the position of the nearby image region from the position where the similarity is estimated, because this method of template matching is well known in the art and including it in Shimizu would yield predictable results.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRED HU whose telephone number is (571)270-7689. The examiner can normally be reached on M-Th, 8am-4pm est..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ F.H. /
Examiner, AU 2624

/Samir A. Ahmed/
Supervisory Patent Examiner, Art Unit 2624